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ABSTRACT

The study compared two special education models, resource and self-contained, to investigate the effects of delivery systems on academic achievement of 170 educable mentally handicapped (EMH) students (8 to 12 years old) and to determine which of the two models is more cost effective. There was a significant effect of educational setting on the academic achievement gains in reading and arithmetic, and there appeared to be a difference between the relative costs per grade level gain in resource and self-contained programs. The resource room programs appeared to be more cost-effective for the education of EMH children. (Author/SBH)

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Abstract

This study compared two special education program models-resource and self-contained. The purpose was to investigate the effects of delivery systems on academic achievement of educable mentally handicapped students and to determine which of the two is more cost effective. One hundred and seventy subjects participated in the study. There was a significant effect of educational setting on the academic achievement gains in the areas of reading and arithmetic. There appeared to be a difference between the relative costs per grade level gain in resource and self-contained programs. The resource room programs appear to be more cost-effective for the education of educable mentally handicapped children.

Problem

Purpose and Objectives

The purpose of this study was to investigate the effects of special education delivery systems on academic achievement of educable mentally handicapped students. Two major types of special education programs - resource and self-contained- were analyzed in order to determine which of the two was more cost-effective for the education of educable mentally handicapped children. Three major postulates underlie this research:

1. EMH children enrolled in resource rooms will score significantly higher on the post-tests of the reading, arithmetic, and spelling of the Wide Range Achievement Test(WRAT) than children enrolled in self-contained programs.
2. That there would be no significant interaction between IQ level and educational setting(resource/self-contained) and academic achievement gain in the areas of reading, spelling, and arithmetic.
3. That there would be no significant difference between the relative costs per grade level gain in resource and self-contained programs.

Review of the Literature

The review of the literature presents investigations concerned with the efficacy of special classes for educable mentally handicapped children and cost-effectiveness of educational programs. Research considered relevant to the

study presented mixed results of the effects of special class placement on the achievement and concomitant effectiveness. Goldstein, Moss, and Jordan (1965) found that higher IQ Educable Mentally Handicapped performed better academically in the regular classroom than they did in self-contained classes, while lower IQ EMH did better in the self-contained classes. The efficacy studies have failed to demonstrate that special classes provide a better education than regular grade placement for EMH students.

The study of costs in special education has thus far been restricted to a measurement of items identified as expenditures. The Rossmiller et al. (1970) study was the pioneering effort concerning resource configuration and costs in special education programs.

A review of the literature reveals that there continues to be a dearth of conclusive evidence to support firmly any one special education environment as having better learning advantages for impaired students.

Procedure

Research Design

The experimental design consisted of three components. Subjects were selected on the basis of IQ and CA, each subject was given pre- and post-test Wide Range Achievement tests during Fall, 1975 and Spring, 1976, and a cost-effectiveness analysis was conducted in order to determine which educational setting (resource/self-contained) was most effective.

Subjects

Subjects were 170 children selected from children enrolled in four school districts in South Carolina. Subjects met the following criteria: they had IQ's between 50 and 75; they were within the age range of 8-0 and 12-6 years; they had received parental permission to be placed in a program for Educable Mentally Handicapped and were attending daily; and a psychological evaluation had been administered within the past two years.

Each student for whom IQ and CA criteria was determined to have been met was grouped into one of the following categories: (1) High Educable/Resource; (2) Low Educable/Resource; (3) High Educable/Self-Contained; and (4) Low Educable/ Self-Contained. The following IQ scores were assigned to the groups: High Educable Resource and Self-Contained - 63-75 and Low Educalbe Resource and Self-Contained - 50-62. Subjects were matched according to IQ and CA and The Wide Range Achievement pre- and post-tests were administered.

Data Analysis Procedures

The research study had three 2 x 2 designs in order to analyze reading, spelling, and arithmetic scores of educable mentally handicapped students. Data were organized and analyzed according to the research hypotheses. The data were analyzed by statistical procedures which included analyses of variance and t tests. Data concerning costs was analyzed utilizing a formula to determine cost per student per grade level achievement gain.

Results

Analysis of variance summaries for the reading, spelling, and arithmetic subtests are presented in Table 1. The obtained mean on the reading subtest for 92 subjects in self-contained and 62 subjects in resource rooms produced significant gains for resource room students ($p < .001$). Significant environmental effects ($F = 10.001$, $df = 1/120$, $p < .01$) were apparent on the WRAT reading subtest. There was no significance between IQ and educational environment. On the arithmetic subtest, the significant difference between mean for treatment main effects indicated that the resource room group yielded growth ($p < .05$) over that of the self-contained group. A significant treatment main effect (environment) resulted in the analysis of variance ($F = 4.89$, $df = 2/120$, $p < .05$). There was no interaction between IQ and performance on the arithmetic subtest. On the spelling subtest, the significant differences between means for treatment main effects indicated that the resource room group yielded growth ($p < .05$) over that of the self-contained group. There was no significant interaction effects between IQ and environment.

There appeared to be a difference between the relative costs per grade level gain in resource and self-contained programs. The following formula was utilized to compute the costs per grade level gain:

$$\frac{\text{Average yearly per pupil cost}}{\text{Average grade level achievement gains per year}} = \frac{\text{Cost per student}}{\text{per grade level gain}}$$

State-aid per pupil costs in South Carolina ranged from a low of $622.29 for regular classroom plus resource room instruction to a high of $923.32 for self-contained programs.

A significant treatment main effect (environment) ($F = 4.89$, $df = 2$ (120, p .05) resulted in the analysis of variance. There was no interaction between IQ and performance on the arithmetic subtest.

SPELLING

The significant differences between means for treatment main effects indicated that the resource room group yielded growth (p .05) over that of the self-contained group on the WRAT spelling subtest. There was no significant interaction effects between IQ and environment.

COSTS

There were differences between the costs of resource and self-contained programs. The self-contained state-aid program costs about two and one-half times more than the resource room program for one month of achievement gain.

CONCLUSIONS

1. High and low educable students enrolled in resource rooms performed better on the post-tests of the Wide Range Achievement Test (WRAT) than their counterparts enrolled in self-contained program. The resource room groups made average grade level achievement gains of 7 (High E) and 6 (LE) months in reading, 9 (HE) and 7 (LE) months in arithmetic and 8 (HE) and 8 (LE) months in spelling. The self-contained groups made average grade level achievement gain of 3 (HE) and 5 (LE) months in reading, 6 (HE)and 4 (LE) months in arithmetic, and 8 (HE) and 4 (LE) months in spelling.

2. There was a significant effect of educational setting resource/self-contained) on the academic achievment gain in the area

The mean regular per pupil expenditure in South Carolina was $879.78. The comparison of state-aid costs in resource and self-contained programs is presented in Figure 1. The self-contained state-aid program costs about two and one-half times more than the resource room program for one month of achievement gain.

Conclusions

The following conclusions appear warranted by the results of the study. These conclusions are restricted to populations similar to those sampled in the present study and to similar special education situations.

1. High and low educable students enrolled in resource rooms performed better on the post-tests of the Wide Range Achievement Test(WRAT) than their counterparts enrolled in self-contained programs. The resource room groups made average grade level achievement gains of 7 months (High Educable) and 6 months (Low Educable) in reading; 9 months (High Educable) and 7 months (Low Educable) in arithmetic; and 8 months (High Educable) and 8 months (Low Educable) in spelling. The self-contained groups made average grade level achievement gains of 3 months (High Educable) and 5 months (Low Educable) in reading; 6 months (High Educable) and 4 months (Low Educable) in arithmetic; and 8 months (High Educable) and 4 months (Low Educable) in spelling.

2. There was a significant effect of educational setting(resource/self-contained) on the academic achievement gain in the area of reading ($p < .001$) and arithmetic ($p < .05$).

3. There appeared to be a difference between the relative costs per grade level gain in resource and self-contained programs. Differences were found between the costs of special education in South Carolina. The state-aid per pupil costs ranged from a low of $622.29 for regular classroom plus resource room instruction to a high of $923.32 for self-contained programs for educable mentally handicapped students. The resource room program model appears to be more cost-effective for the education of high and low educable students.

Table 1
Analyses of Variance for WRAT Subtests

Reading

Source	df	MS	+
Environment (A)	1	1.900	10.001 **
IQ (B)	1	3.541	.0563
A and B	1	2.453	.116
Error			

** $p < .01$

Arithmetic

Source	df	MS	F
Environment (A)	1	4.302	4.894
IQ (B)	1	1.473	1.676
A and B	1	.030	.999
Error	117	1.992	

Spelling

Source	df	MS	F
Environment (A)	1	0.417	0.505
IQ (B)	1	2.125	2.574
A and B	1	1.266	1.534
Error	117	1.292	

Figure I

Comparison of State-Aid Per Pupil Costs in
Educable Mentally Handicapped Resource and Self-Contained Programs

I. Total State-Aid Cost Per Pupil

A.	Self-Contained	$923.32
B.	Resource	$622.29
C.	Cost Differential	$301.03

II. Average Grade Level Achievement Gain Per Year

A.	Self-Contained	6 months
B.	Resource	8 months

III. Cost Per Student Per Grade Level Gain:

$$\frac{\text{Average yearly per pupil cost}}{\text{Average grade level achievement gain per year}}$$

A.	Self-Contained	$184.66
B.	Resource	$ 77.77
C.	Cost/Achievement Differential	$106.89